



Fact Sheet: **Big Piney Reservoir (a.k.a. Frostburg Reservoir) MD, TMDL**

WATERBODY/WATERSHED	Big Piney Reservoir (watershed code 05-02-02-04) is an impoundment located in northeastern Garrett County, MD, part of the Youghiogheny River Watershed. Inflow to the Lake is primarily via Big Piney Run River.
DATE TMDL APPROVED	TMDL Approved: February 14, 2004 Lead Agency: Maryland Department of the Environment (MDE)
BASIS FOR 303(d) LISTING	Originally listed on MD's draft 2002 303(d) list as impaired by mercury contamination, based on data for mercury concentrations in fish tissue and presence of fish consumption advisories (i.e., impaired due to violation of narrative standard since fishing use not supported).
WATER QUALITY STANDARDS TARGET & TMDL TARGET	<p>WQS Target: Methylmercury fish tissue concentration criterion of 235 µg/kg for any trophic level, to support the narrative water quality standards Surface Water Use Designation of Use III-P –<i>Natural Trout Waters and Public Water Supply</i>.</p> <p>TMDL Target: Average annual load of 15.34 grams per year (0.0420 grams per day); Interim allowable water column target value is 0.312 ng/L of total Hg.</p>
EXISTING SOURCE LOADINGS	<p>Nonpoint Sources:</p> <ul style="list-style-type: none"> -Load from direct air deposition to the reservoir = 0.0153 g/day (10.7%). -Load from NPS from the surrounding watershed* = 0.1274 g/day (89.3%). <p>Majority of sources from air deposition (Statewide estimates: 43% from power plants; 31% municipal waste combustors; 19% medical waste incinerators; 6% Portland Cement plants; and 1% other—landfills, oil-fired plants, and other industries).</p> <p>Estimated Point Sources: 0.0 g/day</p>
METHOD FOR CHARACTERIZING EXISTING LOADINGS	<p>Nonpoint Sources: Five monitoring stations of National Atmospheric Deposition Program – Mercury Deposition Network (NADP-MDN) were used to estimate statewide geometric mean of annual wet mercury air deposition in nearby states. Dry deposition was then estimated based on proportional relationship using EPA-approved RELMAP estimates. MDE estimated total nonpoint source loads from air deposition and watershed sources using mass balance approach.</p> <p>Point Sources: No point sources currently exist</p> <p>Note: Maryland is in the process of updating the methodology of determining mercury loading, both in terms of modeling (switching to a CALPUFF-based method) and using an upgrading emissions data inventory.</p>
METHOD FOR DETERMINING ALLOWABLE LOAD (LOADING CAPACITY)	<p>Bioaccumulation Factor Analysis:</p> <p>MDE determined an appropriate Biological Accumulation Factor (BAF) of 2,221,756 L/kg based on observed TL4 (trophic level four) fish tissue data and observed water column concentrations.</p> <p>Maximum Allowable Ambient Water Column Concentration:</p> <p>Using the BAF, MDE calculated a maximum Allowable Ambient Water Column Concentration (AAWCC) of (.754 ng/L) that ensured the targeted water quality goal of a mean fish tissue concentration of methylmercury remains below the target value of 235µg/kg.</p> <p>Mass-Balance Approach:</p> <p>Using a mass balance approach, MDE estimated the TMDL target that will result in the desired water quality target. This target consists of the AAWCC that is adjusted to account for particulate mercury. The computational procedure assumes a constant direct atmospheric deposition of mercury to the surface of the lake, and a constant loading from the watershed that feeds the lake.</p>



REDUCTIONS NEEDED TO REACH TARGET	<p>Reductions in Nonpoint Sources:</p> <ul style="list-style-type: none"> - Direct deposition to the reservoir = $0.0153 - 0.0044 = 0.0109$ g/day (71%) - Load from surrounding watershed = $0.1274 - 0.0364 = 0.091$ g/day (71%) <p>Reductions in Point Sources: Not applicable</p>
ALLOCATIONS	<p>WLA: 0.0 g/day</p> <p>LA: 0.0408 g/day (Direct deposition: 0.0044 g/day, or 10.38%; Load from surrounding watershed: 0.0363 g/day, or 86.62%)</p> <p>Future Allocation: 0.46 g/yr (0.0012 g/day, or 3.0 %) reserved for point sources</p> <p>TMDL: 15.34 g/year (0.0420 g/day)</p>
MARGIN OF SAFETY	<p>Implicit MOS. MDE sampled trophic level 4 fish which represents a conservative assumption of exposure to humans. MDE used a more stringent threshold value (235 µg/kg) for mercury in fish tissue than EPA's recommended threshold of 300 µg/kg. MDE's AAWCC formula also includes the computation of the maximum allowable mercury in fish tissue, based on human health risk principles. All these conservative assumptions resulted in an effectively lower maximum fish tissue concentration of about 172 µg/kg.</p>
REASONABLE ASSURANCE	<p>Not applicable since point sources do not exist.</p> <p>TMDL includes a section on "Assurance of Implementation", described below</p>
IMPLEMENTATION	<p>Reduced atmospheric contributions are expected to be accomplished over time through existing and proposed regulatory controls (e.g., Clean Air Act). At the time of TMDL development, it was too early for the effectiveness of mercury reduction strategies for some atmospheric emission source categories (primarily electrical generating plants and cement kilns) to be estimated with confidence. In Maryland, regulations had been issued for municipal waste combustors (to be in effect by 2000) and medical waste incinerators (to be in effect by 2002). These regulations were expected to reduce mercury emissions from municipal waste combustors by 90% from 1990 levels and mercury emissions from medical waste incinerators by 94% from 1990 levels.</p> <p>In addition to controls on mercury air emissions, proper management of mercury containing productions and source reduction are critical components to reducing mercury in the waste stream and to the environment.</p> <p>No specific implementation plan has been developed for this TMDL. However, since the time of TMDL development, legislation has been enacted on the federal and State level to address mercury (and other) emissions from electrical generating plants. Maryland's Healthy Air Act (HAA) is expected to reduce mercury emissions by 80% (by 2010) and 90% (by 2013) from 13 coal-fired electrical generating units that account for about 98% of the State's coal-derived electrical generation.</p>
MONITORING	<p>Fish tissue monitoring occurs on a regular basis, by MDE as well as Maryland DNR and research interests. As part of Maryland's Watershed Cycling Strategy, follow-up monitoring and assessment will be conducted to evaluate the impairment status of Big Piney Reservoir.</p>